DOCUMENT RESUME

ED 259 940 SE 045 913

AUTHOR	Disinger, John F.
TITLE	Instruction in Awareness of Environmental Issues. ERIC/SMEAC Environmental Education Digest No. 1.
INSTITUTION	ERIC Clearinghouse for Science, Mathematics, and Environmental Education, Columbus, Ohio.
SPONS AGENCY	National Inst. of Education (ED), Washington, DC.
PUB DATE	85
CONTRACT	400-78-0004
NOTE	3p.
AVAILABLE FROM	SMEAC Information Reference Center, The Ohio State University, 1200 Chambers Road, 3rd Floor, Columbus, OH 43212 ($1.00).
PUB TYPE	Information Analyses - ERIC Information Analysis Products (071)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Environmental Education; Field Trips; *Instructional Improvement; Integrated Curriculum; *Interdisciplinary Approach; *Perception; *Values Clarification
IDENTIFIERS	*Environmental Education Research; *Environmental Issues; ERIC Digests; Wilderness

ABSTRACT

This digest contains an abridgment of a section of a chapter on "Environmental Education Research Related to Issue Awareness" from the 1984 National Commission for Environmental Education Research (NCEER) Report. The paper was prepared by Randall Wiesenmeyer, Maureen Murrin, and Audrey Tomera. Only the section of the paper dealing with instructional strategies for developing awareness of environmental issues is provided. Major areas considered include: (1) use and abuse of wilderness; (2) interdisciplinary approaches; (3) values orientation; (4) integrated curriculum; and (5) research conclusions. A list of references (with ED numbers for documents in ERIC) is included. (ML)

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ED259940

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ERIC/SMEAC Environmental Education Digest No. 1

1985

INSTRUCTION IN AWARENESS OF ENVIRONMENTAL ISSUES

The National Commission for Environmental Education Research (NCEER), established in 1980 by the National Association for Environmental Education (now the North American Association for Environmental Education, NAEE) to gather and examine the rapidly growing body of environmental education research literature, has released its second report, *A Summary of Environmental Education Research 1971-1982* (Iozzi, 1984).

The first NCEER report, *Research in Environmental Education 1971-1980* (Iozzi, 1981), contained 429 abstracts of journal papers, fugitive documents, and dissertations from the decade in question, indexed by author and multiple descriptors. The second report reports an additional 73 papers through December 1982, and consists primarily of six comprehensive papers summarizing the results of the 502 total studies reported in six areas: environmental education research related to ecological foundations, the affective domain, issue awareness, investigation and evaluation skills, environmental action skills, and teacher training.

This digest contains an abridgement of a section of a chapter on "Environmental Education Research Related to Issue Awareness" from the 1984 NCEER Report. The paper was prepared by Randall L. Wiesenmeyer, Maureen A. Murrin, and Audrey N. Tomera. Only the section of the paper dealing with instructional strategies for developing awareness of environmental issues is included here.

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In the traditional classroom setting, research reported by the NCEER summaries examined the effectiveness of curricula and methods for presenting knowledge of environmental issues using approaches such as an interdisciplinary model, simulations, and games.

Experimental research conducted by Bryant and Hungerford (1977) evaluated a kindergarten unit which focused on understanding the term "environment," associated pollution problems and their remediation. Results indicated that kindergarten children can form concepts concerning environmental issues and citizenship responsibility with respect to those issues. Not only were these children able to identify actions which they themselves could take, but also many of the children were able to identify actions which adults could take. According to the researchers, environmental education at the kindergarten level can result in some fairly sophisticated conceptual behavior on the part of the students involved.

Use and Abuse of Wilderness

The effects of an environmental unit on upper elementary students' concepts and knowledge about woodlands and associated environmental problems were studied by Gross and Pizzini (1979). The unit was presented for two months prior to a field trip to a preserve. Seventy fifth grade students were randomly selected from a population of 295 for pre-testing. The remaining students received the post-test, along with 85 sixth-grade students who had received the treatment one year previously. The researchers reported that the treatment resulted in a more positive student orientation concerning use and abuse of wilderness. However, history and maturation effects were not controlled in this study. Also noted was a change in sensory and affective awareness of a natural community resulting from the one-day field trip. To maximize the effects of the limited time spent in the field, the authors recommended classroom instructional activities to facilitate concept formation prior to a field experience.

The effectiveness of a project designed to enhance awareness of environmental issues was researched by DeLuca, Kiser, and Frazer (1978). Seventy-five males and 75 females from each grade level, 10-12, and 100 males and 100 females from each grade level, 4-9, were randomly selected to participate. A nearby school without a similar program served as the control group. Environmental knowledge and attitude tests were administered at all grade levels following instruction; statistically significant differences were found between the groups, in favor of the experimental group.

Crater and Mears (1981) studied the impact of an energy unit on the knowledge and attitudes of eighth graders toward energy problems. In this study, the treatment groups received an interdisciplinary energy activity packet developed by the National Science Teachers Association (NSTA) while a control group received a regular science course. Following completion of the unit, the control and treatment groups were evaluated on their knowledge of and attitudes toward energy problems. The treatment group's attitude toward energy problems was more positive for each item on the instrument than was that of the control group. The authors concluded that the treatment group was more conservation-minded and aware of limited energy sources than was the control group.

Interdisciplinary Approaches

The effects of utilizing an interdisciplinary approach as opposed to a traditional approach for examining problems were addressed by Hepburn (1978). Her findings revealed differences in post-test scores between science/social studies modules of instruction involving ninth-grade and slower tenth grade students. Comparisons were made at each grade level across four treatments: a science module, a social studies module, an interdisciplinary module, and a control treatment. Results indicated that the interdisciplinary treatment groups attained the highest mean gain scores.

The effectiveness of a problem-solving module in aiding participants in understanding and solving environmental problems was examined by Andren (1979), who used community college students as the study sample. The problem-solving model consisted of 21 questions grouped into six areas of problem identification, historical context, and proposing and testing solutions. An analysis of the contents of the students' investigative reports indicated that the experimental group discussed economics, law, transportation issues, and population issues to a significantly greater extent than did the control group. It was concluded that this model was useful in systematically focusing students' attention to some of the necessary components of environmental problem-solving.

Values Orientation

In a descriptive study by Supreka and Harms (1977), two methods of presenting environmental education were compared to determine their effects on students' knowledge and attitudes toward energy and environmental issues. Eight teachers used an inquiry (non-values-oriented) approach, and eight others used a values-oriented approach to teach a six-week environmental education unit to more than 600 high school students. Both treatments were found to produce significant cognitive gains, compared to the control classes. The authors suggested that there was no difference in students' gains in knowledge between the two approaches, and only a slight difference in attitudes toward environmental issues.

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In a study of the effectiveness of simulation games over other teaching strategies Bottinelli (1980) found, in his study involving 720 high school students, that the group receiving three days of traditional lecture, with no discussion, fared significantly better on immediate cognitive and affective assessments than did three other groups, each of which participated in a different environmental simulation game. No significant cognitive retention differences were noted among the simulation groups. Bottinelli concluded that although simulation games may not be as effective in teaching environmental concepts or in forming immediate positive attitudes as traditional methods, they may act as a foundation from which more positive environmental attitudes can evolve and be retained for longer periods of time.

Bazan's evaluation (1976) of four simulation games addressed two problems associated with environmental simulation games: limited participation and lack of economic relationships. In the four simulation games which he developed, ecological and economic systems were modeled and up to 40 players could participate. The games simulated the behaviors, problems, and conditions of producers, consumers, farmers, agricultural policy makers, and the participants in a complex economic system. Participants became cognizant that the human socioeconomic system was problem-laden, and without quick and easy solutions. The games were reported to be the most popular part of the course, but their effectiveness over alternative strategies was not tested formally.

Integrated Curriculum

Case's study (1979) to determine the effect of an integrated eight-week environmental education curriculum integrated into the regular school curriculum revealed opposite findings, however. In his study, sixth-grade students of a Seventh-Day Adventist School were randomly selected and assigned to three groups. Group A was treated with an integrated curriculum for five weeks, one week of a resident field experience, and an additional two weeks of integrated classroom curriculum. Group B was treated with only the integrated curriculum for eight weeks; Group C acted as a control, receiving no environmental curriculum activities. A test was constructed to measure environmental knowledge. On the knowledge test, statistically significant differences in favor of the B group were found in comparisons with Group A and with Group C. No significant differences were found between Groups A and C.

Studies that examined the effects of outdoor environmental programs found statistically significant changes in campers' knowledge of environmental issues. Chitwood (1977) found changes in environmental knowledge resulting from a camping experience. In her study, the effects of an eight-week session at a Youth Conservation Camp (YCC) on 58 enrollees were measured to determine the relationship, if any, between and among environmental knowledge, locus of control, and environmental attitudes. Pre- and post-tests were administered to detect the extent of changes in the variables. Statistical analysis indicated that significant changes, in a positive direction, were attained in environmental knowledge and environmental attitudes, but not in locus of control.

A study of Davis, Doran, and Farr (1980) supports Chitwood's findings. In the Davis, et al., study, 14,796 YCC campers from 194 camps were sampled to assess their environmental awareness before and after their camp experience. Each camper completed a questionnaire either before or after the camp experience. Of the eleven domains of goals developed, six knowledge domains showed statistically significant gains, as did the attitudinal domain. Reliability of the tests and homogeneity of the domains were estimated.

Summary

Based on the results of the studies reviewed above, Wiesenmayer, et al., arrived at the following conclusions:

1. Traditional classroom instruction can increase students' environmental knowledge;
2. Interdisciplinary approaches for examining environmental problems seem to be more effective than traditional approaches;
3. Simulation games tend to be enjoyed by the participants but may not be as effective in teaching environmental concepts or in forming positive attitudes as traditional approaches;
4. A combination of classroom instruction and field trips may be a very effective means of increasing students' knowledge of environmental issues;
5. Field trips appear to have the most impact on student learning when occurring prior to classroom instruction; and
6. Resident outdoor environmental learning activities can increase students' knowledge of environmental issues.

References

Andrer, Richard Johnson. "The Use of a Problem-Solving Model in Environmental Education." Ph. D. dissertation, Columbia University Teachers College, 1979. *Dissertation Abstracts International*, 39(12):7263-A.

Bottinelli, Charles Adrian. "The Efficacy of Population/Resources/Environment Simulation Games and Traditional Teaching Strategies: Short- and Long-Term Cognitive and Affective Retention." Ed.D. dissertation, University of Colorado at Boulder, 1980. *Dissertation Abstracts International*, 41(4):1518-A.

Bryant, Covey K., and Harold R. Hungerford. "An Analysis of Strategies for Teaching Environmental Concepts and Values Clarification in Kindergarten." *Journal of Environmental Education*, 9(1):44-49, 1977.

Crater, Harold L., and David E. Meers. "Evaluatory Attitudes Toward, and Knowledge of, Energy Problems in Eighth Grade." *School Science and Mathematics*, 81(2):121-123, 1981.

DeLuca, Frederick P., Luther L. Kiser, and Kenneth F. Frazer, "Environmental Education and the Interrelationships among Attitudes, Knowledge, Achievement, and Piagetian Levels." In *Current Issues in Environmental Education IV* (Arthur B. Sacks, et al., editors), pp 186-192. ED 167 407.

Gross, Michael P., and Edward L. Pizzini, "The Effects of Combined Advance Organizers and Field Experience on Environmental Orientations of Elementary School Children." *Journal of Research in Science Teaching*, 16(4):325-331, 1979.

Hepburn, Mary A. "Environmental Knowledge and Attitude Changes in a High School Program of Interdisciplinary Social Studies and Science Education." In *Current Issues in Environmental Education IV* (Arthur B. Sacks, et al., editors), pp. 175-185. ED 167 407.

Iozzi, Louis A., editor. *Research in Environmental Education, 19, 1-1980*. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 1981. ED 214 762.

Iozzi, Louis A., editor. *A Summary of Research in Environmental Education 1971-1982*. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 1984. SE 045 290.

Supreka, Douglas P., and Norris Harms. "A Comparative Evaluation of Values-Oriented and Non-Values-Oriented Environmental Education Materials, Final Report." Social Science Education Consortium, Inc., Boulder, CO, 1977. ED 175 777.

Wiesenmayer, Randall L., Maureen A. Murrin, and Audrey N. Tomera. "Environmental Education Research Related to Issue Awareness." In *A Summary of Environmental Education Research 1971-1982* (Louis A. Iozzi, editor). Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 1984. SE 045 290.

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This publication was prepared with funding from the National Institute of Education, U.S. Department of Education under contract no. 400-78-0004. The opinions expressed in this report do not necessarily reflect the positions or policies of NIE or U.S. Department of Education.